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Zoo Vowels

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Zoo Vowels

Interactive Media and Game Development
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A Major Qualifying Project Report
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Table of Contents

Abstract

Zoo Vowels is a duel Interactive Media and Game Development and Computer Science Major Qualifying Project striving to conceptualize, build, test, and release a prototype of a full iPad game built in XCode. The game serves as a spelling tutor for elementary level students learning to spell words with vowels. The project went through an engineering process of phases in which the team of one artist and three programmers designed, developed, and tested their assigned tasks.

The first phase of the development conceptualization and familiarization was previously completed. The artist of the team conceptualized her work through drawing. These drawings were overseen by our advisors and underwent changes. The technology team tested and familiarized themselves with the Apple programming software, something no members had used before.

The second phase included the creation of all the art assets as well as implementing them into the game using the programming software. At the end of this phase an alpha version of the game was completed and ready to be tested.

The final phase consisted of testing and polishing the Zoo Vowels game. The game was tested with Britt Snyder's daughter as well as brought into kindergarten classrooms at Beal Early Childhood Center in Shrewsbury, Massachusetts. Comments and observations from teachers and children at these playtests were used in the final polishing process of our project.

List of Figures

Introduction

Zoo vowels in a single player spelling tutor game. It is designed for children between the preschool and second grade level who are learning how to spell and more specifically learning to spell using vowels to complete words. The consonants of the words are given while the vowel location of a word is left blank. The player must fill in the missing vowel letter to successfully spell the word correctly.

The project team formed in A-term 2012. Due to having a double major on the team and to allow for extra time, the project was spread out over four terms. Janelle MacLaughlin created all the art for the game and Matthew Ferreira, Dustin Lombardi, and Jeremy Ridoré formed the programming team.

Artistically we strove for a kid friendly look, relying on a combination of hand drawn elements, construction paper character, and tissue paper overlays. The technical work consisted of testing similar spelling tutor games to attain similar mechanics and functionality. We first made an HTML prototype used to get feedback from teachers on game structure. We then gathered feedback and made the Zoo Vowels App. Lastly we adjusted the App based on user feedback from children within our target audience.

This document discusses the design and development process of Zoo Vowels. The first three sections cover the design, art, and technology behind our game. Finally, information on play testing is included.

Gameplay

The user play's as the zookeeper's special helper responsible for assisting the zookeeper in caring for the animals. In order to care for the animals you must complete a level at each of the eight designated locations. On each level you must fill in the appropriate vowel to complete the word that is pictured above. Each time you successfully complete a word one animal is cared for. The levels continually increase in difficulty as you play the game. The vowel letter entered measures the difficulty. Every level consists of aiding 10 animals. This persists through all 8 levels of the game. Each level is geared toward a different grouping of vowels and to reinforce previous levels as they progress. Each level only presents only the targeted vowels. This means that for our first level the target vowels are A and O so these are the only vowels used in the words and allowed in the vowel bank.

Figure 1

Above is an example of a typical level. You see a picture of a bug and below this is the word you must spell. The first letter is a wood block “b”, a blank space, and the third letter is a wood block “g”. In order to successfully help the zookeeper take care of the lion and to spell the word correctly you must drag the letter “u” between the “b” and “g”. Once you successfully do this you will hear a message such as “good job” as well as see an arrow that directs you to the next word. You will also see that five lions have been cared for (5/10).

Level Design

We designed our game based on the progression teachers are currently using. We asked for materials used at the Shrewsbury Kindergarten. We then based the progression of the game as closely as possible to the progression they use to teach their students. Our progression goes as follows:

1. A, O

2. I, U

3. A, E, U

4. A, E, I

5. A, E, O, U

6. A, I, O, U

7. A, E, I, O, U

The beginning levels more closely relate to the teaching progressions teachers use and we used the later levels to reinforce all the vowels and slowly introduce the student to having more vowels eventually using A, E, I, O, and U. We limited each level to only have the vowel bank consist of the vowels needed for that level. We did this as opposed to having all vowels given to the student at once because each student will be at a different stage in their learning. This means that some students will not be able to understand all the vowels when they first play this game. Limiting the vowel bank allows these students to be less encumbered. The game allows the student to replay previous levels they did not feel comfortable with at any point. This allows for the student to stay within their comfort areas until they are confident enough to progress further.

Winning and Losing

Our game has no sense of 'losing' just incorrect answers. We don't want to make the children feel like they've failed. That's why we have the gentle 'not quite', 'try again', 'that's not it', and 'almost' responses to keep a child's spirits up to continue playing. The 'winning' feeling comes from successfully completing the level. We are trying to stress practice makes perfect.

Art Development

We only had one artist on the project. Janelle MacLaughlin created all assets in the game. The development of art assets began as soon as the project started, beginning with the conceptualization and design of the assets necessary for the development of the game. This section will go over the art development process in detail, covering conceptualization and design. The different types of assets in the game are the zoo characters, environments, word images, zoo map, and general user interface(UI).

Zoo Characters

The zoo animals and zookeeper are the characters that you see within the game. The zookeeper serves as the narrator to the game. She welcomes you to Zoo Vowels and asks you to help her feed and take care of the animals. There are eight zoo animals in total: a lion, elephant, zebra, giraffe, monkey, hippo, penguin, and polar bear.

The game is designed for young children therefore Janelle looked at several children's books while brainstorming and conceptualizing the characters. Books that Janelle looked at for inspiration included Splat the Cat by Rob Scotton, The Magic Hat by Mem Fox, Leo the Late Bloomer by Robert Kraus, Polar Bear, Polar Bear, What Do You Hear? By Eric Carle, and The Curious Garden by Peter Brown. Ultimately Janelle settled on a style influenced by Eric Carle. Janelle looked at several other books he illustrated including: Have you seen my cat? Brown Bear, Brown Bear, What Do You See? 1,2,3, to the Zoo, Do You Want to Be My Friend? and Does A Kangaroo Have A Mother, Too?

Each character went through the same design process. Janelle first drew the character in pencil on white paper. Then Janelle cut out the characters as you can see below.

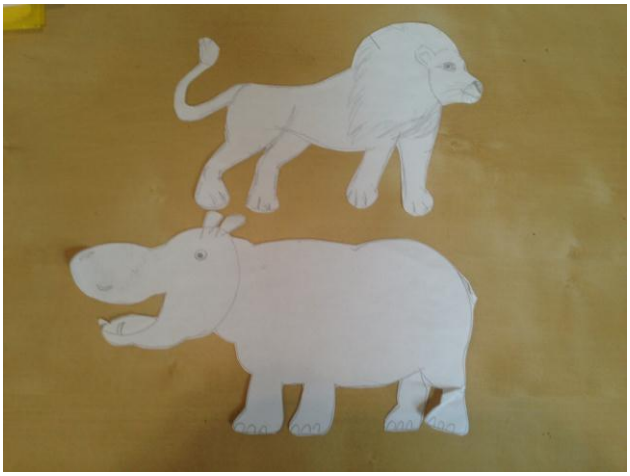

Figure 2
White paper versions of characters

I then traced the paper versions onto colored scrapbook paper. You can see this in figure 3.

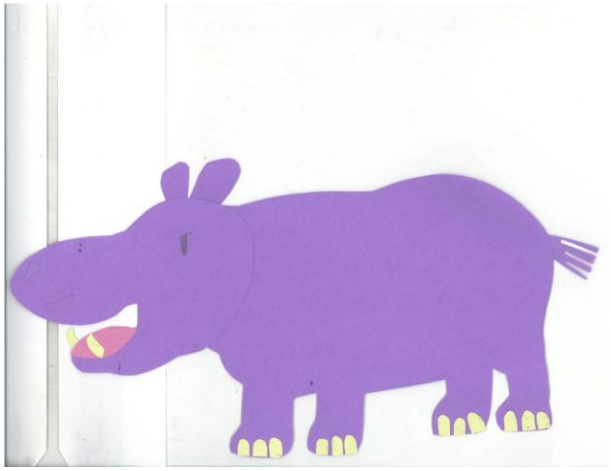

Figure 3
Scrapbook paper version of character

Janelle then scanned character onto the computer. Janelle imported the animals into Adobe Photoshop. Using tissue paper photos found on Google Images, Janelle overlaid layers of tissue paper over the construction paper animals. This ultimately is the style that can be seen in the finished game. These final characters can be seen in figures 4 and 5.

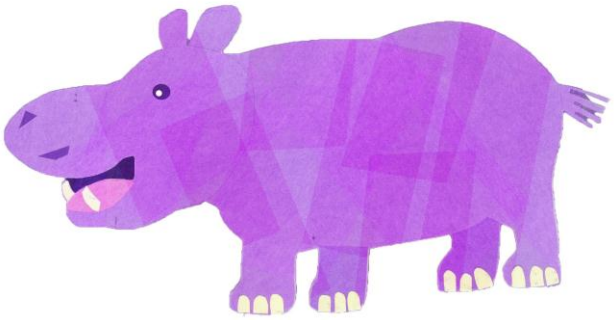

Figure 4
Final version of character

Figure 5
Final version of character

Zoo Environments

Since the characters were the first assets made in the game the environments had to flow and work with them. To be consistent with the characters, the environments were made using broad shapes and bright colors. The main influence and inspiration for the environment style was the app Goodnight Safari, an eBook illustrated by Luciana Navarro. Using the paintbrush style brushes in Photoshop I made eight different zoo landscape environments. Examples of the initial environments can be seen in figures 6 and 7.

Figure 6
Initial environment

Figure 7
Initial environment

After inserting the zoo animals into the environments and receiving feedback we decided to add a tissue paper overlay to the environments. This gave the animals and environment a consistent style. This final style can be seen in figures 8 and 9.

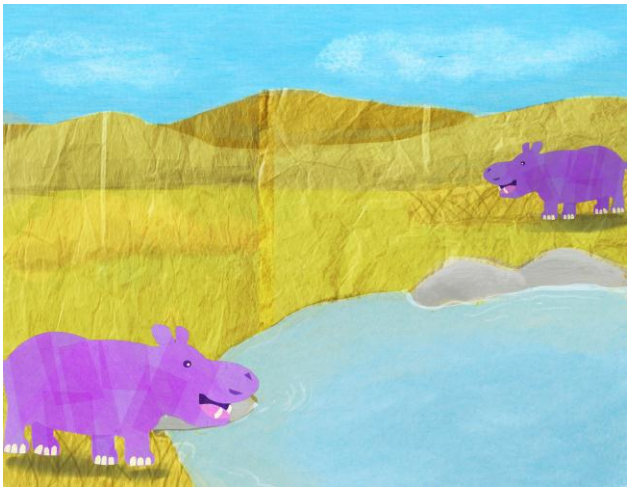

Figure 8
Final environment style

Figure 9
Final environment style

Word Images

Since spelling words in the main object of the game, there is a large amount of word images. Therefore we decided that the most time friendly way to make these was to quickly sketch the word images with pen and paper. After creating the images Janelle then scanned them onto the computer and imported them into Adobe Photoshop. In Photoshop Janelle added color to each image.

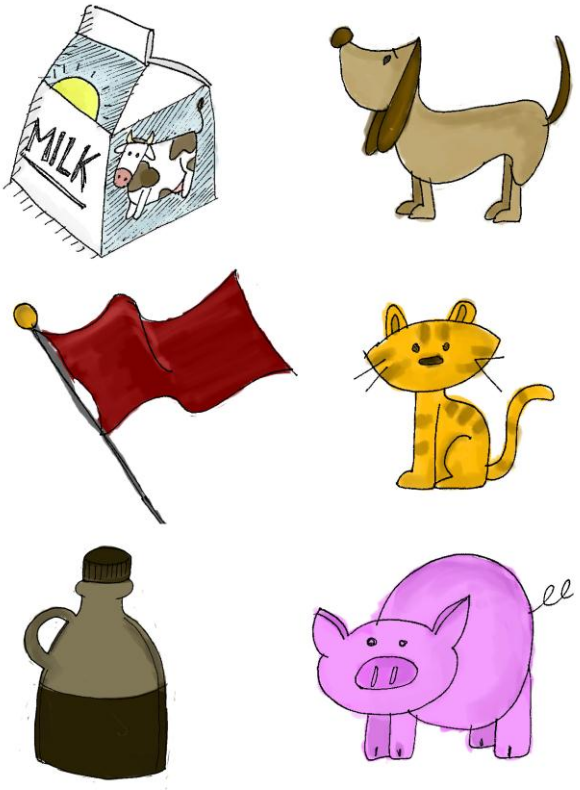

Figure 10
Final word image pictures

Zoo Map

The zoo map is essentially the home screen of the game. This is where to player enters each level. For inspiration I looked at several maps from Zoos around the world including the Singapore Zoo, San Diego Zoo, Knoxville Zoo, Pittsburgh Zoo, and numerous others. Janelle wanted the map to flow with the rest of the assets in the game but also make it standout from the tissue paper style of the zoo animals. Janelle used simple shapes, defined lines, and bright colors to create the map. After creating the basic bones of a map, the last step to make the map game ready was to "populate" it. Janelle did this by adding things like rocks, ponds, signs, and zoo buildings. In figures 11-14 you can see the various versions the map went through with the completion of the game.

Figure 11

The initial conceptualized map

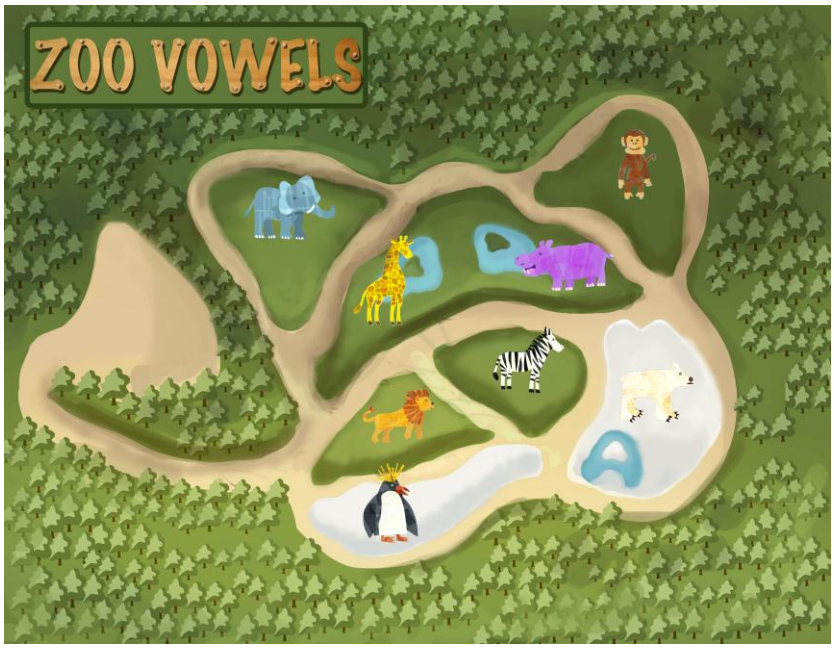

Figure 12

Second version of the map

Figure 13

Third version of the map

Figure 14

Final populated version of the map

User Interface (UI)

After creating all the game assets we then focused on the UI. The UI is what we believe would take this game from being a “school project” to something that could professionally be displayed on the Apple App Store. The general game UI that frames the word you are spelling is meant to look like a wooden toy box. The word picture is framed with a painted box of primary colors. The alphabet is also written out using a font that looks similar to white chalk. The vowel letters are framed with wood. Each wooden block letter is given its own assigned area. When you pull out each block an imprint of the vowel letter is left in the box. This UI game can be seen in figure 15.

Figure 15

UI frame for spelling words in the game

To keep with the wood toy box style Janelle made the letters used to spell the words wooden block letters. The vowel letters are a different color from the consonant letters to stick out.

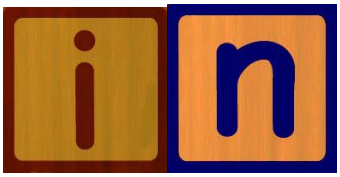

Figure 16

The wooden block letters used to spell words in the game

Another large UI asset is the Zoo Vowels game logo. This logo can be seen on the app icon as well as on the map. The logo is meant to look similar to an actual zoo sign. The logo stands out because it is made with a realistic style rather than the simple cutout style of the rest of the game.

Figure 17
ZOO Vowels game logo

The app icon was the last piece of art designed for the game. Since the icon has to be versatile in its size based on where it is displayed (on the app store, on an iPhone, on an iPad, etc) it is important that its simple enough to recognizable at a small size but also have enough detail to look good and not pixelated when displayed at a larger size. Ultimately we decided on using the icon with our Zoo Vowels logo.

Figure 18
Version 1 of the app icon

Figure 19

Version 2 of the app icon (the one that is used in the game)

Figure 20

Version 3 of the app icon

Technology

We had three developers on the project. Dustin Lombardi, Matthew Ferreira, and Jeremy Ridoré wrote all the code for the game. The code development began as soon as the project started, beginning with a web based prototype of the basic functionality of the game. Then we migrated the functionality into Objective-C code for the iOS application. This section will go over the three main controllers of the application, the Sound Controller, the Map Controller, and the Level Controller.

Sound Controller

The Sound Controller controls all the sounds played in the game. All sounds are in the voice of Erika DiLorenzo. Sounds consist of the intro sequence explaining how the user will be aiding Zoe the Zoo Keeper in her duties around the zoo, the word images, and the correct and incorrect feedback responses. Whenever a sound needs to be

triggered, we make a call to the Sound Controller playSound function passing in the string of a sound file.

Map Controller

The Map Controller controls all actions pertaining to the Zoo map. Map Controller functions consist of moveZoe and showLevel. The moveZoe function moves the Zoe character from level to level. The showLevel function reveals the next available animal level.

Level Controller

The Level Controller controls all the level gameplay. Upon load of each level, the Level Controller parses the level indicator variable set by the Map Controller when the user chooses a level to decide which word bank to load. Next, the Level Controller iterates through the word bank, loading the word image and filling in the word blocks. After a level is completed, the Level Controller sends the user to what we call the congratulations screen which congratulates the user for finishing the level. Finally the user is taken back to the Zoo map continuing the game.

Testing

Our testing included our prototype along with our App. We first tested an HTML prototype with teachers from the Shrewsbury Kindergarten. We received feedback regarding ascetics such as all students should be introduced to letters and lowercase as our first attempt used uppercase letters. We also received input on verbal feedback for the student and allowing the student to tap the picture to hear the word again. With this feedback along with our prototype be aimed to make a better version of our prototype as an iPad App.

Nearing the end of completion we tested it with a student age 4. This student would be entering Kindergarten in the next school year. Through watching the student play and their questions we realized that normal conventions were less understood by a younger audience. These conventions include buttons and how to navigate through a game. While the student quickly learned how to progress after the first level the student needed assistance to get started. With this information we moved a character to each level to visually show to progression so the student would know where they should go along with having a glow on the animal they should be clicking. We also removed some navigation elements such as touching a button to progress words and made this automated.

After these changes we tested again with a student age 5, which is currently in Kindergarten. The student then reiterated the questions of how to progress through each level. With this we then make the buttons and areas that were next in the progression flicker or flash on and off. This made the buttons more obvious for the students on the screen. After this last iteration navigation became much less of a problem.

Conclusion

We have received a lot of positive feedback regarding the quality and usefulness of our game. This shows that there is a growing need for serious games. With this need the industry and then grow in new ways to cover our new modern needs. More and more classrooms are getting new tools such as iPads to assist their students in learning. These and other tools like them make a new market for teaching Apps. We hope to be able to continue or development and submit our game to the market.